

What is claimed is:

1. A coating comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
- 5 2. The coating of claim 1, wherein the active biomolecule comprises a proteinaceous molecule.
3. The coating of claim 2, wherein the proteinaceous molecule binds a
10 ligand, contacts a living organism, or a combination thereof.
4. The coating of claim 3, wherein the proteinaceous molecule binds a ligand.
- 15 5. The coating of claim 4, wherein the ligand comprises an antigen, a substrate, an inhibitor, or a combination thereof.
6. The coating of claim 5, wherein the ligand comprises a chemical toxic to
20 humans.
7. The coating of claim 6, wherein the ligand comprises an organophosphorus compound.
8. The coating of claim 2, wherein the proteinaceous molecule comprises a
25 peptide, a polypeptide, a protein, or a combination thereof.
9. The coating of claim 8, wherein the proteinaceous molecule comprises an
30 enzyme, an antibody, a receptor, a transport protein, structural protein, or a combination thereof.
10. The coating of claim 8, wherein the proteinaceous molecule comprises an enzyme.
11. The coating of claim 10, wherein the enzyme comprises an
35 oxidoreductase, a transferase, a hydrolase, a lyase, an isomerase, a ligase, or a combination thereof.
12. The coating of claim 11, wherein the enzyme comprises a hydrolase.
- 40 13. The coating of claim 12, wherein the hydrolase comprises an esterase.
14. The coating of claim 13, wherein the esterase comprises a phosphoric triester hydrolase.

15. The coating of claim 14, wherein the phosphoric triester hydrolase comprises an aryldialkylphosphatase, a diisopropyl-fluorophosphatase, or a combination thereof.
- 5 16. The coating of claim 14, wherein the phosphoric triester hydrolase comprises a combination of phosphoric triester hydrolases.
17. The coating of claim 15, wherein the phosphoric triester hydrolase comprises an aryldialkylphosphatase.
- 10 18. The coating of claim 15, wherein the aryldialkylphosphatase comprises an organophosphorus hydrolase, a human paraoxonase, an animal carboxylase, or a functional equivalent thereof.
- 15 19. The coating of claim 15, wherein the aryldialkylphosphatase comprises an organophosphorus hydrolase or a functional equivalent thereof.
20. The coating of claim 19, wherein the organophosphorus hydrolase comprises an *Agrobacterium radiobacter* P230 organophosphate hydrolase, a
20 *Flavobacterium balustinum* parathion hydrolase, a *Pseudomonas diminuta* phosphotriesterase, a *Flavobacterium sp opd* gene product, a *Flavobacterium sp.* parathion hydrolase *opd* gene product, or a functional equivalent thereof.
21. The coating of claim 20, wherein the organophosphorus hydrolase
25 comprises a functional equivalent of *Agrobacterium radiobacter* P230 organophosphate hydrolase, a *Flavobacterium balustinum* parathion hydrolase, a *Pseudomonas diminuta* phosphotriesterase, a *Flavobacterium sp opd* gene product, or a *Flavobacterium sp.* parathion hydrolase *opd* gene product.
- 30 22. The coating of claim 21, wherein the functional equivalent is a structural analog.
23. The coating of claim 22, wherein the structural analog comprises a Co^{2+} , Fe^{2+} , Cu^{2+} , Mn^{2+} , Cd^{2+} , or Ni^{2+} at the enzyme active site.
- 35 24. The coating of claim 21, wherein the functional equivalent is a sequence analog.
25. The coating of claim 21, wherein the sequence analog is an alteration in
40 sequence length.
26. The coating of claim 24, wherein the sequence analog lacks a leader peptide sequence.
- 45 27. The coating of claim 24, wherein the sequence analog is a fusion protein.

28. The coating of claim 20, wherein the organophosphorus hydrolase comprises a *Pseudomonas diminuta* phosphotriesterase, or a functional equivalent thereof.

5 29. The coating of claim 28, wherein the organophosphorus hydrolase comprises a *Pseudomonas diminuta* phosphotriesterase.

10 30. The coating of claim 28, wherein the organophosphorus hydrolase comprises a *Pseudomonas diminuta* phosphotriesterase functional equivalent.

31. The coating of claim 28, wherein the *Pseudomonas diminuta* phosphotriesterase functional equivalent comprises a sequence analog.

15 32. The coating of claim 31, wherein the sequence analog comprises an amino acid substitution.

33. The coating of claim 32, wherein the sequence analog is H55C, H57C, C59A, G60A, S61A, I106A, I106G, W131A, W131F, W131K, F132A, F132H, F132Y, L136Y, L140Y, H201C, H230C, H254A, H254R, H254S, H257A, H257L, H257Y, L271A, L271Y, L303A, F306A, F306E, F306H, F306K, F306Y, S308A, S308G, Y309A, M317A, M317H, M317K, M317R, H55C/H57C, H55C/H201C, H55C/H230C, H57C/H201C, H57C/H230C, A80V/S365P, I106A/F132A, I106A/S308A, I106G/F132G, I106G/S308G, F132Y/F306H, F132H/F306H, F132H/F306Y, F132Y/F306Y, F132A/S308A, F132G/S308G, L182S/V310A, H201C/H230C, H254R/H257L, H55C/H57C/H201C, H55C/H57C/H230C, H55C/H201C/H230C, I106A/F132A/H257Y, I106A/F132A/H257W, I106G/F132G/S308G, L130M/H257Y/I274N, H257Y/I274N/S365P, H55C/H57C/H201C/H230C, I106G/F132G/H257Y/S308G, or A14T/A80V/L185R/H257Y/I274N.

30 34. The coating of claim 17, wherein the arylalkylphosphatase comprises a human paraoxonase or a functional equivalent thereof.

35 35. The coating of claim 34, wherein the human paraoxonase comprises an HPON1 gene product or a functional equivalent thereof.

36. The coating of claim 35, wherein the human paraoxonase comprises a HPON1 gene product functional equivalent.

40 37. The coating of claim 28, wherein the HPON1 gene product functional equivalent comprises a sequence analog.

45 38. The coating of claim 37, wherein the sequence analog comprises an amino acid substitution.

39. The coating of claim 38, wherein the sequence analog is E32A, E48A, E52A, D53A, D88A, D107A, H114N, D121A, H133N, H154N, H160N, W193A, W193F, W201A, W201F, H242N, H245N, H250N, W253A, W253F, D273A, W280A, W280F, H284N, or H347N.

40. The coating of claim 17, wherein the arylalkylphosphatase comprises an animal carboxylase.

41. The coating of claim 40, wherein the animal carboxylase comprises an insect carboxylase or a functional equivalent thereof.

42. The coating of claim 41, wherein the insect carboxylase comprises a *Plodia interpunctella* carboxylase, *Chrysomya putoria* carboxylase, *Lucilia cuprina* carboxylase, *Musca domestica* carboxylase, or a functional equivalent thereof.

43. The coating of claim 15, wherein the phosphoric triester hydrolase comprises a diisopropyl-fluorophosphatase.

44. The coating of claim 43, wherein the diisopropyl-fluorophosphatase comprises an organophosphorus acid anhydrolase, a squid-type DFPase, a Mazur-type DFPase, or a functional equivalent thereof.

45. The coating of claim 44, wherein the diisopropyl-fluorophosphatase comprises an organophosphorus acid anhydrolase or a functional equivalent thereof.

46. The coating of claim 45, wherein the organophosphorus acid anhydrolase comprises an *Altermonas* organophosphorus acid anhydrolase, a prolidase, or a functional equivalent thereof.

47. The coating of claim 46, wherein the organophosphorus acid anhydrolase comprises an *Altermonas* organophosphorus acid anhydrolase or a functional equivalent thereof.

48. The coating of claim 47, wherein the *Altermonas* organophosphorus acid anhydrolase comprises an *Alteromonas* sp JD6.5 organophosphorus acid anhydrolase, an *Alteromonas haloplanktis* organophosphorus acid anhydrolase, an *Altermonas undina* organophosphorus acid anhydrolase, or a functional equivalent thereof.

49. The coating of claim 46, wherein the organophosphorus acid anhydrolase comprises a prolidase or a functional equivalent thereof.

50. The coating of claim 49, wherein the prolidase comprises a human prolidase, a *Mus musculus* prolidase, a *Lactobacillus helveticus* prolidase, an

Escherichia coli prolidase, an *Escherichia coli* aminopeptidase P, or a functional equivalent thereof.

51. The coating of claim 44, wherein the diisopropyl-fluorophosphatase
5 comprises a squid-type DFPase, or a functional equivalent thereof.

52. The coating of claim 51, wherein the squid-type DFPase comprises a
Loligo vulgaris DFPase, a *Loligo pealei* DFPase, a *Loligo opalescens* DFPase, or
a functional equivalent thereof.

10 53. The coating of claim 52, wherein the squid-type DFPase comprises a
Loligo vulgaris DFPase, or a functional equivalent thereof.

54. The coating of claim 53, wherein the squid-type DFPase comprises a
15 *Loligo vulgaris* DFPase, or a functional equivalent thereof.

55. The coating of claim 54, wherein the squid-type DFPase comprises a
Loligo vulgaris DFPase functional equivalent.

20 56. The coating of claim 55, wherein the *Loligo vulgaris* DFPase functional
equivalent comprises a sequence analog.

57. The coating of claim 56, wherein the sequence analog comprises an
amino acid substitution.

25 58. The coating of claim 57, wherein the sequence analog is H181N, H224N,
H274N, H219N, H248N, or H287N.

59. The coating of claim 57, wherein the sequence analog is an alteration in
30 sequence length.

60. The coating of claim 59, wherein the sequence analog is a fusion protein.

61. The coating of claim 44, wherein the diisopropyl-fluorophosphatase
35 comprises a Mazur-type DFPase or a functional equivalent thereof.

62. The coating of claim 61, wherein the Mazur-type DFPase comprises a
mouse liver DFPase, a hog kidney DFPase, a *Bacillus stearothermophilus* strain
OT DFPase, an *Escherichia coli* DFPase, or a functional equivalent thereof.

40 63. The coating of claim 1, wherein the phosphoric triester hydrolase
comprises a *Plesiomonas* sp. strain M6 *mpd* gene product, a *Xanthomonas* sp.
phosphoric triester hydrolase, a *Tetrahymena* phosphoric triester hydrolase, or a
functional equivalent thereof.

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64. The coating of claim 2, wherein the proteinaceous molecule contacts a living organism.

5 65. The coating of claim 64, wherein the proteinaceous molecule comprises a ligand capable of binding to an active biomolecule of the living organism.

66. The coating of claim 65, wherein the active biomolecule of the living organism comprises a receptor, an enzyme, a transport protein, or a combination thereof.

10 67. The coating of claim 1, wherein the biomolecular composition comprises 0.001% to 40% of the coating composition by weight or volume.

15 68. The coating of claim 1, wherein the active biomolecule comprises 0.001% to 40% of the coating composition by weight or volume.

69. The coating of claim 1, wherein the biomolecule composition comprises a microorganism based particulate material.

20 70. The coating of claim 69, wherein the microorganism based particulate material is a whole cell material.

71. The coating of claim 70, wherein the microorganism based particulate material is a cell fragment microorganism based particulate material.

25 72. The coating of claim 1, wherein the coating comprises a buffer.

73. The coating of claim 21, wherein the buffer comprises a bicarbonate.

30 74. The coating of claim 1, wherein the coating is 5 μm to 1500 μm thick upon the surface.

75. The coating of claim 1, wherein the coating is 15 μm to 500 μm thick upon the surface.

35 76. The coating of claim 1, wherein the coating comprises a paint.

77. The coating of claim 1, wherein the coating comprises a clear coating.

40 78. The coating of claim 77, wherein the clear coating comprises a lacquer, a varnish, a shellac, a stain, a water repellent coating, or a combination thereof.

79. The coating of claim 1, wherein the coating comprises a multicoat system.

45 80. The coating of claim 79, wherein the multicoat system comprises 2 to 10 layers.

81. The coating of claim 80, wherein one layer of the multicoat system comprises the biomolecular composition.

5 82. The coating of claim 80, wherein a plurality of layers of the multicoat system comprise the biomolecular composition.

83. The coating of claim 80, wherein each layer of the multicoat system is coating is 15 um to 150 um thick.

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84. The coating of claim 79, wherein the multicoat system comprises a sealer, a water repellent, a primer, an undercoat, or a topcoat.

15 85. The coating of claim 79, wherein the multicoat system comprises a topcoat.

86. The coating of claim 85, wherein the topcoat comprises the biomolecular composition.

20 87. The coating of claim 1, wherein the coating comprises a binder, a liquid component, a colorant, an additive, or a combination thereof.

88. The coating of claim 1, wherein the coating undergoes film formation.

25 89. The coating of claim 88, wherein film formation occurs at ambient conditions.

90. The coating of claim 88, wherein film formation occurs at baking conditions.

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91. The coating of claim 90, wherein baking conditions is between 40°C and 50°C.

35 92. The coating of claim 90, wherein baking conditions is between 40°C and 65°C.

93. The coating of claim 90, wherein baking conditions is between 40°C and 110°C.

40 94. The coating of claim 88, wherein the coating comprises a volatile component and a non-volatile component.

95. The coating of claim 94, wherein the coating undergoes film formation by loss of part of the volatile component.

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96. The coating of claim 94, wherein the volatile component comprises a volatile liquid component.

5 97. The coating of claim 96, wherein the volatile liquid component comprises a solvent, a thinner, a diluent, or a combination thereof.

98. The coating of claim 94, wherein the non-volatile component comprises a binder, a colorant, a plasticizer, a coating additive, or a combination thereof.

10 99. The coating of claim 88, wherein film formation occurs by crosslinking of a binder.

100. The coating of claim 99, wherein film formation occurs by crosslinking of a plurality of binders.

15 101. The coating of claim 88, wherein film formation occurs by irradiating the coating.

102. The coating of claim 1, wherein the coating produces a self-cleaning film.

20 103. The coating of claim 1, wherein the coating is a non-film forming coating.

104. The coating of claim 103, wherein the non-film forming coating comprises a non-film formation binder.

25 105. The coating of claim 103, wherein the non-film forming coating comprises a coating component in a concentration that is insufficient to produce a solid film.

30 106. The coating of claim 105, wherein the coating component comprises a binder that contributes to thermoplastic film formation.

107. The coating of claim 105 wherein the coating component contributes to thermosetting film formation.

35 108. The coating of claim 107, wherein the coating component comprises a binder, catalyst, initiator, or combination thereof.

109. The coating of claim 105, wherein the coating component has a concentration of 0%.

40 110. The coating of claim 110, wherein the coating produces a temporary film.

111. The coating of claim 110, wherein the temporary film has a poor resistance to a coating remover.

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112. The coating of claim 110, wherein the temporary film has a poor scrub resistance, a poor solvent resistance, a poor water resistance, a poor weathering property, a poor adhesion property, or a combination thereof.

5 113. The coating of claim 1, wherein the coating comprises an architectural coating, an industrial coating, a specification coating, or a combination thereof.

114. The coating of claim 1, wherein the coating comprises an architectural coating.

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115. The coating of claim 114, wherein the architectural coating comprises a wood coating, a masonry coating, an artist's coating, or a combination thereof.

116. The coating of claim 114, wherein the architectural coating has a pot life of at least 12 months at ambient conditions.

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117. The coating of claim 114, wherein the architectural coating undergoes film formation at ambient conditions.

20 118. The coating of claim 1, wherein the coating comprises an industrial coating.

119. The coating of claim 118, wherein the industrial coating comprises an automotive coating, a can coating, sealant coating, a marine coating, or a combination thereof.

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120. The coating of claim 119, wherein the industrial coating undergoes film formation at baking conditions.

30 121. The coating of claim 1, wherein the coating comprises a specification coating.

122. The coating of claim 121, wherein the specification coating comprises a pipeline coating, traffic marker coating, aircraft coating, a nuclear power plant coating, or a combination thereof.

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123. The coating of claim 1, wherein the coating comprises a water-borne coating.

40 124. The coating of claim 123, wherein the water-borne coating is a latex coating.

125. The coating of claim 123, wherein the water-borne coating has a density of 1.20 kg/L to 1.50 kg/L.

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126. The coating of claim 1, wherein the coating comprises a solvent-borne coating.

5 127. The coating of claim 126, wherein the solvent-borne coating has a density of 0.90 kg/L to 1.2 kg/L.

128. The coating of claim 1, wherein the coating has a viscosity during application of 72 Ku to 95 Ku.

10 129. The coating of claim 1, wherein the coating has a viscosity prior to application of 100 P to 1000 P.

130. The coating of claim 1, wherein the coating has a viscosity during application of 0.5 P to 2.5 P.

15 131. The coating of claim 1, wherein the coating has a viscosity of 100 P to 1000 P upon a surface immediately after application.

132. The coating of claim 1, wherein the coating comprises a binder.

20 133. The coating of claim 132, wherein the binder comprises a thermoplastic binder, a thermosetting binder, or a combination thereof.

25 134. The coating of claim 133, wherein the coating comprises a thermoplastic binder.

135. The coating of claim 134, wherein the coating produces a film by thermoplastic film formation.

30 136. The coating of claim 133, wherein the coating comprises a thermosetting binder.

137. The coating of claim 136, wherein the coating produces a film by thermosetting film formation.

35 138. The coating of claim 132, wherein the binder comprises an oil-based binder.

40 139. The coating of claim 138, wherein the oil-based binder comprises an oil, an alkyd, an oleoresinous binder, a fatty acid epoxide ester, or a combination thereof.

45 140. The coating of claim 139, wherein the coating produces a layer 15 μm to 25 μm thick upon the vertical surface or 15 μm to 40 μm thick upon the horizontal surface.

141. The coating of claim 132, wherein the binder comprises an oil.

142. The coating of claim 132, wherein the binder comprises an alkyd.

5 143. The coating of claim 132, wherein the binder comprises an oleoresinous binder.

144. The coating of claim 132, wherein the binder comprises a fatty acid epoxide ester.

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145. The coating of claim 132, wherein the binder comprises a polyester resin.

146. The coating of claim 145, wherein the polyester resin comprises a hydroxy-terminated polyester.

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147. The coating of claim 145, wherein the polyester resin comprises a carboxylic acid-terminated polyester.

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148. The coating of claim 145, wherein the coating comprises a urethane, an amino resin, or a combination thereof.

149. The coating of claim 132, wherein the binder comprises a modified cellulose.

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150. The coating of claim 149, wherein the modified cellulose comprises a cellulose ester.

151. The coating of claim 149, wherein the modified cellulose comprises a nitrocellulose.

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152. The coating of claim 149, wherein the coating comprises an amino binder, an acrylic binder, urethane binder, or a combination thereof.

153. The coating of claim 132, wherein the binder comprises a polyamide.

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154. The coating of claim 153, wherein the coating comprises an epoxide.

155. The coating of claim 132, wherein the binder comprises an amino resin.

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156. The coating of claim 155, wherein the coating comprises an acrylic binder, an alkyd resin, a polyester binder, or a combination thereof.

157. The coating of claim 132, wherein the binder comprises an urethane binder.

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158. The coating of claim 157, wherein the coating comprises a polyol, an amine, an epoxide, a silicone, a vinyl, a phenolic, a triacrylate, or a combination thereof.

5 159. The coating of claim 132, wherein the binder comprises a phenolic resin.

160. The coating of claim 159, wherein the coating comprises an alkyd resin, an amino resin, a blown oil, an epoxy resin, a polyamide, a polyvinyl resin, or a combination thereof.

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161. The coating of claim 132, wherein the binder comprises an epoxy resin.

162. The coating of claim 161, wherein the coating comprises an amino resin a phenolic resin, a polyamide, a ketimine, an aliphatic amine, or a combination thereof.

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163. The coating of claim 161, wherein the epoxy resin comprises a cycloaliphatic epoxy binder.

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164. The coating of claim 163, wherein the coating comprises a polyol.

165. The coating of claim 132, wherein the binder comprises a polyhydroxyether binder.

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166. The coating of claim 165, wherein the coating comprises an epoxide, a polyurethane comprising an isocyanate moiety, an amino resin, or a combination thereof.

167. The coating of claim 132, wherein the binder comprises an acrylic resin.

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168. The coating of claim 167, wherein the coating comprises an epoxide, a polyurethane comprising an isocyanate moiety, an amino resin, or a combination thereof.

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169. The coating of claim 132, wherein the binder comprises a polyvinyl binder

170. The coating of claim 169, wherein the coating comprises an alkyd, an urethane, an amino-resin, or a combination thereof.

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171. The coating of claim 132, wherein the binder comprises a rubber resin.

172. The coating of claim 171, wherein the rubber resin comprises a chlorinated rubber resin, a synthetic rubber resin, or a combination thereof.

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173. The coating of claim 171, wherein the coating comprises an acrylic resin, an alkyd resin, a bituminous resin, or a combination thereof.

174. The coating of claim 132, wherein the binder comprises a bituminous binder.
- 5 175. The coating of claim 174, wherein the coating comprises an epoxy resin.
176. The coating of claim 132, wherein the binder comprises a polysulfide binder.
- 10 177. The coating of claim 176, wherein the coating comprises a peroxide, a binder comprising an isocyanate moiety, or a combination thereof.
178. The coating of claim 132, wherein the binder comprises a silicone binder.
- 15 179. The coating of claim 178, wherein the coating comprises an organic binder.
180. The coating of claim 1, wherein the coating comprises a liquid component.
- 20 181. The coating of claim 180, wherein the liquid component comprises a solvent, a thinner, a diluent, a plasticizer, or a combination thereof.
182. The coating of claim 180, wherein the liquid component comprises a liquid organic compound, an inorganic compound, water, or a combination thereof.
- 25 183. The coating of claim 180, wherein the liquid component comprises a liquid organic compound.
184. The coating of claim 183, wherein the liquid organic compound comprises
- 30 a hydrocarbon, an oxygenated compound, a chlorinated hydrocarbon, a nitrated hydrocarbon, a miscellaneous organic liquid component, a plasticizer, or a combination thereof.
185. The coating of claim 184, wherein the liquid organic compound comprises
- 35 a hydrocarbon.
186. The coating of claim 185, wherein the hydrocarbon comprises an aliphatic hydrocarbon, a cycloaliphatic hydrocarbon, a terpene, an aromatic hydrocarbon, or a combination thereof.
- 40 187. The coating of claim 186, wherein the hydrocarbon comprises an aliphatic hydrocarbon.
188. The coating of claim 187, wherein the aliphatic hydrocarbon comprises a
- 45 petroleum ether, pentane, hexane, heptane, isododecane, a kerosene, a mineral spirit, a VMP naphthas, or a combination thereof.

189. The coating of claim 186, wherein the hydrocarbon comprises a cycloaliphatic hydrocarbon.

5 190. The coating of claim 189, wherein the cycloaliphatic hydrocarbon comprises cyclohexane, methylcyclohexane, ethylcyclohexane, tetrahydronaphthalene, decahydronaphthalene, or a combination thereof.

191. The coating of claim 186, wherein the hydrocarbon comprises a terpene.

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192. The coating of claim 191, wherein the terpene comprises wood turpentine oil, pine oil, α -pinene, β -pinene, dipentene, D-limonene, or a combination thereof.

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193. The coating of claim 186, wherein the hydrocarbon comprises an aromatic hydrocarbon.

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194. The coating of claim 193, wherein the aromatic hydrocarbon comprises benzene, toluene, ethylbenzene, xylene, cumene, a type I high flash aromatic naphthas, a type II high flash aromatic naphthas, mesitylene, pseudocumene, cymol, styrene, or a combination thereof.

195. The coating of claim 184, wherein the liquid organic compound comprises an oxygenated compound.

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196. The coating of claim 195, wherein the oxygenated compound comprises an alcohol, an ester, a glycol ether, a ketone, an ether, or a combination thereof.

197. The coating of claim 196, wherein the oxygenated compound comprises an alcohol.

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198. The coating of claim 197, wherein the alcohol comprises methanol, ethanol, propanol, isopropanol, 1-butanol, isobutanol, 2-butanol, *tert*-butanol, amyl alcohol, isoamyl alcohol, hexanol, methylisobutylcarbinol, 2-ethylbutanol, isooctyl alcohol, 2-ethylhexanol, isodecanol, cyclohexanol, methylcyclohexanol, trimethylcyclohexanol, benzyl alcohol, methylbenzyl alcohol, furfuryl alcohol, tetrahydrofurfuryl alcohol, diacetone alcohol, trimethylcyclohexanol, or a combination thereof.

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199. The coating of claim 196, wherein the oxygenated compound comprises an ester.

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200. The coating of claim 199, wherein the ester comprises methyl formate, ethyl formate, butyl formate, isobutyl formate, methyl acetate, ethyl acetate, propyl acetate, isopropyl acetate, butyl acetate, isobutyl acetate, *sec*-butyl acetate, amyl acetate, isoamyl acetate, hexyl acetate, cyclohexyl acetate, benzyl acetate, methyl glycol acetate, ethyl glycol acetate, butyl glycol acetate, ethyl

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diglycol acetate, butyl diglycol acetate, 1-methoxypropyl acetate, ethoxypropyl acetate, 3-methoxybutyl acetate, ethyl 3-ethoxypropionate, isobutyl isobutyrate, ethyl lactate, butyl lactate, butyl glycolate, dimethyl adipate, glutarate, succinate, ethylene carbonate, propylene carbonate, butyrolactone, or a combination thereof.

201. The coating of claim 196, wherein the oxygenated compound comprises a glycol ether.

202. The coating of claim 201, wherein the glycol ether comprises methyl glycol, ethyl glycol, propyl glycol, isopropyl glycol, butyl glycol, methyl diglycol, ethyl diglycol, butyl diglycol, ethyl triglycol, butyl triglycol, diethylene glycol dimethyl ether, methoxypropanol, isobutoxypropanol, isobutyl glycol, propylene glycol monoethyl ether, 1-isopropoxy-2-propanol, propylene glycol mono-n-propyl ether, propylene glycol n-butyl ether, methyl dipropylene glycol, methoxybutanol, or a combination thereof.

203. The coating of claim 196, wherein the oxygenated compound comprises a ketone.

204. The coating of claim 203, wherein the ketone comprises acetone, methyl ethyl ketone, methyl propyl ketone, methyl isopropyl ketone, methyl butyl ketone, methyl isobutyl ketone, methyl amyl ketone, methyl isoamyl ketone, diethyl ketone, ethyl amyl ketone, dipropyl ketone, diisopropyl ketone, cyclohexanone, methylcyclohexanone, trimethylcyclohexanone, mesityl oxide, diisobutyl ketone, isophorone, or a combination thereof.

205. The coating of claim 196, wherein the oxygenated compound comprises an ether.

206. The coating of claim 205, wherein the ether comprises diethyl ether, diisopropyl ether, dibutyl ether, di-sec-butyl ether, methyl tert-butyl ether, tetrahydrofuran, 1,4-dioxane, metadioxane, or a combination thereof.

207. The coating of claim 184, wherein the liquid organic compound comprises a chlorinated hydrocarbon.

208. The coating of claim 207, wherein the chlorinated hydrocarbon comprises methylene chloride, trichloromethane, tetrachloromethane, ethyl chloride, isopropyl chloride, 1,2-dichloroethane, 1,1,1-trichloroethane, trichloroethylene, 1,1,2,2-tetrachloroethane, 1,2-dichloroethylene, perchloroethylene, 1,2-dichloropropane, chlorobenzene, or a combination thereof.

209. The coating of claim 184, wherein the liquid organic compound comprises a nitrated hydrocarbon.

210. The coating of claim 209, wherein the nitrated hydrocarbon comprises a nitroparaffin, N-methyl-2-pyrrolidone, or a combination thereof.

5 211. The coating of claim 184, wherein the liquid organic compound comprises a miscellaneous organic liquid.

212. The coating of claim 209, wherein the miscellaneous organic liquid comprises carbon dioxide; acetic acid, methylal, dimethylacetal, *N,N*-dimethylformamide, *N,N*-dimethylacetamide, dimethylsulfoxide, tetramethylene
10 suflone, carbon disulfide, 2-nitropropane, *N*-methylpyrrolidone, hexamethylphosphoric triamide, 1,3-dimethyl-2-imidazolidinone, or a combination thereof.

15 213. The coating of claim 184, wherein the liquid organic compound comprises a plasticizer.

214. The coating of claim 213, wherein the plasticizer comprises an adipate, an azelate, a citrate, a chlorinated plasticizer, an epoxide, a phosphate, a sebacate, a phthalate, a polyester, a trimellitate, or a combination thereof.

20 215. The coating of claim 180, wherein the liquid component comprises an inorganic compound.

25 216. The coating of claim 215, wherein the inorganic compound comprises ammonia, hydrogen cyanide, hydrogen fluoride, hydrogen cyanide, sulfur dioxide, or a combination thereof.

217. The coating of claim 180, wherein the liquid component comprises water.

30 218. The coating of claim 217, wherein the liquid component further comprises methanol, ethanol, propanol, isopropyl alcohol, *tert*-butanol, ethylene glycol, methyl glycol, ethyl glycol, propyl glycol, butyl glycol, ethyl diglycol, methoxypropanol, methyldipropylene glycol, dioxane, tetrahydorfuran, acetone, diacetone alcohol, dimethylformamide, dimethyl sulfoxide, ethylbenzene,
35 tetrachloroethylene, *p*-xylene, toluene, diisobutyl ketone, trichlorethylene, trimethylcyclohexanol, cyclohexyl acetate, dibutyl ether, trimethylcyclohexanone, 1,1,1-tricholoroethane, hexane, hexanol, isobutyl acetate, butyl acetate, isophorone, nitropropane, butyl glycol acetate, 2-nitropropane, methylene chloride, methyl isobutyl ketone, cyclohexanone, isopropyl acetate, methylbenzyl
40 alcohol, cyclohexanol, nitroethane, methyl *tert*-butyl ether, ethyl acetate, diethyl ether, butanol, butyl glycolate, isobutanol, 2-butanol, propylene carbonate, ethyl glycol acetate, methyl acetate, methyl ethyl ketone, or a combination thereof.

45 219. The coating of claim 87, wherein the coating comprises a colorant.

220. The coating of claim 219, wherein the colorant comprises a pigment, a dye, a combination thereof.

221. The coating of claim 220, wherein the colorant comprises a pigment.

222. The coating of claim 221, wherein the biomolecule composition comprises 0.001% to 100% of the pigment.

223. The coating of claim 222, wherein the pigment volume concentration of the coating is 20% to 60%.

224. The coating of claim 221, wherein the pigment comprises a corrosion resistance pigment, a camouflage pigment, a color property pigment, an extender pigment, or a combination thereof.

225. The coating of claim 224, wherein the pigment comprises a corrosion resistance pigment.

226. The coating of claim 225, wherein the corrosion resistance pigment comprises aluminum flake, aluminum triphosphate, aluminum zinc phosphate, ammonium chromate, barium borosilicate, barium chromate, barium metaborate, basic calcium zinc molybdate, basic carbonate white lead, basic lead silicate, basic lead silicochromate, basic lead silicosulfate, basic zinc molybdate, basic zinc molybdate-phosphate, basic zinc molybdenum phosphate, basic zinc phosphate hydrate, bronze flake, calcium barium phosphosilicate, calcium borosilicate, calcium chromate, calcium plumbate, calcium strontium phosphosilicate, calcium strontium zinc phosphosilicate, dibasic lead phosphite, lead chromosilicate, lead cyanamide, lead suboxide, lead sulfate, mica, micaceous iron oxide, red lead, steel flake, strontium borosilicate, strontium chromate, tribasic lead phosphosilicate, zinc borate, zinc borosilicate, zinc chromate, zinc dust, zinc hydroxy phosphite, zinc molybdate, zinc oxide, zinc phosphate, zinc potassium chromate, zinc silicophosphate hydrate, zinc tetraoxylchromate, or a combination thereof.

227. The coating of claim 225, wherein the coating is a metal surface coating.

228. The coating of claim 225, wherein the coating is a primer.

229. The coating of claim 224, wherein the pigment comprises a camouflage pigment.

230. The coating of claim 229, wherein the camouflage pigment comprises an anthraquinone black, a chromium oxide green, or a combination thereof.

231. The coating of claim 224, wherein the pigment comprises a color property pigment.

232. The coating of claim 231, wherein the color property pigment comprises a black pigment, a brown pigment, a white pigment, a pearlescent pigment, a violet pigment, a blue pigment, a green pigment, a yellow pigment, an orange pigment, a red pigment, a metallic pigment, or a combination thereof.

233. The coating of claim 232, wherein the color property pigment comprises aniline black; anthraquinone black; carbon black; copper carbonate; graphite; iron oxide; micaceous iron oxide; manganese dioxide, azo condensation, benzimidazolone, iron oxide; metal complex brown; antimony oxide; basic lead carbonate; lithopone; titanium dioxide; white lead; zinc oxide; zinc sulphide; titanium dioxide and ferric oxide covered mica, bismuth oxychloride crystal, dioxanine violet, carbazol Blue; carbazole Blue; cobalt blue; copper phthalocyanine; dioxanine Blue; indanthrone; phthalocyanin blue; Prussian blue; ultramarine; chrome green; chromium oxide green; halogenated copper phthalocyanine; hydrated chromium oxide; phthalocyanine green; anthrapyrimidine; arylamide yellow; barium chromate; benzimidazolone yellow; bismuth vanadate; cadmium sulfide yellow; complex inorganic color pigment; diarylide yellow; disazo condensation; flavanthrone; isoindoline; isoindolinone; lead chromate; nickel azo yellow; organic metal complex; quinophthalone; yellow iron oxide; yellow oxide; zinc chromate; perinone orange; pyrazolone orange; anthraquinone; benzimidazolone; BON arylamide; cadmium red; cadmium selenide; chrome red; dibromanthrone; diketopyrrolo-pyrrole pigment; disazo condensation pigment; lead molybdate; perylene; pyranthrone; quinacridone; quinophthalone; red iron oxide; red lead; toluidine red; tonor pigment; β -naphthol red; aluminum flake; aluminum non-leafing, gold bronze flake, zinc dust, stainless steel flake, nickel flake, nickel powder, or a combination thereof.

234. The coating of claim 224, wherein the pigment comprises an extender pigment.

235. The coating of claim 234, wherein the extender pigment comprises a barium sulphate, a calcium carbonate, a kaolin, a calcium sulphat, a silicate, a silica, an alumina trihydrate; or a combination thereof.

236. The coating of claim 87, wherein the coating comprises an additive.

237. The coating of claim 236, wherein the additive comprises 0.001% to 20.0% by weight, of the coating.

238. The coating of claim 236, wherein said additive comprises an accelerator, an adhesion promoter, an antifoamer, anti-insect additive, an antioxidant, an antiskinning agent, a buffer, a catalyst, a coalescing agent, a corrosion inhibitor, a defoamer, a dehydrator, a dispersant, a drier, electrical additive, an emulsifier, a filler, a flame/fire retardant, a flattening agent, a flow control agent, a gloss aid, a leveling agent, a marproofing agent, a preservative, a silicone additive, a slip

agent, a surfactant, a light stabilizer, a rheological control agent, a wetting additive, or a combination thereof.

239. The coating of claim 236, wherein the additive comprises a preservative.

240. The coating of claim 239, wherein the preservative comprises an in-can preservative, an in-film preservative, or a combination thereof.

241. The coating of claim 239, wherein the preservative comprises a biocide.

242. The coating of claim 241, wherein the biocide comprises a bactericide, a fungicide, an algacide, or a combination thereof.

243. The coating of claim 236, wherein the additive comprises a wetting additive, a dispersant, or a combination thereof.

244. The coating of claim 236, wherein the additive comprises an anti-foamer, a defoamer, or a combination thereof.

245. The coating of claim 238, wherein the additive comprises a rheological control agent.

246. The coating of claim 245, wherein the rheological control agent comprises a thickener, a viscosifier, or a combination thereof.

247. The coating of claim 238, wherein the additive comprises a corrosion inhibitor.

248. The coating of claim 247, wherein said corrosion inhibitor comprises an in-can corrosion inhibitor, a flash corrosion inhibitor, or a combination thereof.

249. The coating of claim 238, wherein the additive comprises a light stabilizer.

250. The coating of claim 249, wherein the light stabilizer comprises a UV absorber, a radical scavenger, or a combination thereof.

251. The coating of claim 1, wherein the coating is a multi-pack coating.

252. The coating of claim 251, wherein the coating is stored in a two to five containers prior to application to the surface.

253. The coating of claim 251, wherein 0.001% to 100% of the biomolecular composition is stored in a container of a multi-pack coating, and at least one additional coating component is stored in another container of a multi-pack coating.

254. The coating of claim 253, wherein the container comprising the biomolecular composition further comprises an additional coating component.

255. The coating of claim 254, wherein the additional coating component comprises a preservative, a wetting agent, a dispersing agent, a buffer, a liquid component, a rheological modifier, or a combination thereof.

256. The coating of claim 255, wherein the additional coating component comprises glycerol.

257. A method of detoxification of a surface contaminated with an organophosphorus compound, comprising the steps of: contacting a surface contaminated with an organophosphorous compound with a coating comprising a biomolecule composition, wherein the biomolecule composition comprises a phosphoric triester hydrolase.

258. The method of claim 257, wherein said organophosphorus compound comprises a chemical warfare agent.

259. The method of claim 258, wherein the chemical warfare agent comprises a persistent agent.

260. The method of claim 258, wherein the chemical warfare agent comprises a G-agent, a V agent, or a combination thereof.

261. The method of claim 260, wherein said G-agent comprises soman, sarin, cyclosarin, tabun, or a combination thereof.

262. The method of claim 260, wherein said V-agent comprises VX, Russian VX, or a combination thereof.

263. The method of claim 257, wherein said organophosphorus compound comprises a pesticide.

264. The method of claim 263, wherein the pesticide comprises a persistent organophosphorous compound.

265. The method of claim 258, wherein the pesticide comprises bromophos-ethyl, chlorpyrifos, chlorfenvinphos, chlorothiophos, chlorpyrifos-methyl, coumaphos, crotoxyphos, cruformate, cyanophos, diazinon, dichlofenthion, dichlorvos, dursban, EPN, ethoprop, ethyl-parathion, etrimifos, famphur, fensulfothion, fenthion, fenthrothion, isofenphos, jodfenphos, leptophos-oxon, malathion, methyl-parathion, mevinphos, paraoxon, parathion, parathion-methyl, pirimiphos-ethyl, pirimiphos-methyl, pyrazophos, quinalphos, ronnel, sulfopros, sulfotepp, trichloronate, or a combination thereof.

266. The method of claim 257, wherein the method further comprises the step of contacting the surface with a caustic agent; a decontaminating foam, a combination of baking condition heat and carbon dioxide, or a combination thereof.

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267. A method of detoxification of an organophosphorus compound, comprising the steps of: contacting an organophosphorous compound with a coating comprising a biomolecule composition, wherein the biomolecule composition comprises a phosphoric triester hydrolase.

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268. A method of reducing the concentration of an organophosphorus compound upon a surface, comprising the steps of: applying to the surface a coating comprising a biomolecule composition, wherein the biomolecule composition comprises a phosphoric triester hydrolase, and contacting the surface with an organophosphorus compound.

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269. A coating comprising 0.001% to 40% by weight or volume a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.

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270. A coating comprising a biomolecule composition, wherein the biomolecule composition comprises a proteinaceous molecule that binds a ligand.

271. A coating comprising a biomolecule composition, wherein the biomolecule composition comprises an enzyme.

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272. A coating comprising a biomolecule composition, wherein the biomolecule composition comprises a phosphoric triester hydrolase.

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273. A coating comprising a biomolecule composition, wherein the biomolecule composition comprises an organophosphorus hydrolase.

274. A coating comprising a biomolecule composition, wherein the biomolecule composition comprises an organophosphorus hydrolase and a buffer.

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275. A coating comprising a microorganism based particulate material, wherein the microorganism based particulate material that comprises an active biomolecule.

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276. A coating comprising a whole cell particulate material, wherein the particulate material comprises an active biomolecule.

277. A coating comprising 0.001% to 40% by weight or volume of a whole cell particulate material, wherein the whole cell particulate material comprises an active biomolecule.

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278. A coating comprising a whole cell particulate material, wherein the particulate material comprises an enzyme.

5 279. A coating comprising a whole cell particulate material, wherein the particulate material comprises a phosphoric triester hydrolase.

280. A coating comprising a whole cell particulate material, wherein the particulate material comprises an organophosphorus hydrolase.

10 281. A coating comprising a whole cell particulate material, wherein the particulate material comprises an organophosphorus hydrolase and a buffer.

15 282. A coating, the improvement comprising inclusion of a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.

20 283. A coating, the improvement comprising inclusion of 0.001% to 40% by weight or volume a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.

284. A coating, the improvement comprising inclusion of a biomolecule composition, wherein the biomolecule composition comprises a proteinaceous molecule that binds a ligand.

25 285. A coating, the improvement comprising inclusion of a biomolecule composition, wherein the biomolecule composition comprises an enzyme.

30 286. A coating, the improvement comprising inclusion of a biomolecule composition, wherein the biomolecule composition comprises a phosphoric triester hydrolase.

35 287. A coating, the improvement comprising inclusion of a biomolecule composition, wherein the biomolecule composition comprises an organophosphorus hydrolase.

288. A coating, the improvement comprising inclusion of a biomolecule composition, wherein the biomolecule composition comprises an organophosphorus hydrolase and a buffer.

40 289. A coating, the improvement comprising inclusion of a microorganism based particulate material, wherein the microorganism based particulate material that comprises an active biomolecule.

45 290. A coating, the improvement comprising inclusion of a whole cell particulate material, wherein the particulate material comprises an active biomolecule.

291. A coating, the improvement comprising inclusion of 0.001% to 40% by weight or volume of a whole cell particulate material, wherein the whole cell particulate material comprises an active biomolecule.

5 292. A coating, the improvement comprising inclusion of a whole cell particulate material, wherein the particulate material comprises an enzyme.

293. A coating, the improvement comprising inclusion of a whole cell particulate material, wherein the particulate material comprises a phosphoric triester
10 hydrolase.

294. A coating, the improvement comprising inclusion of a whole cell particulate material, wherein the particulate material comprises an organophosphorus
15 hydrolase.

295. A coating, the improvement comprising inclusion of a whole cell particulate material, wherein the particulate material comprises an organophosphorus
hydrolase and a buffer.

20 296. A water-borne paint comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.

297. A solvent-borne paint comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
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298. A latex paint comprising a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase.

299. An oil-based paint comprising a whole cell particulate material, wherein
30 the whole cell particulate material comprises a phosphoric triester hydrolase.

300. A latex paint comprising a whole cell particulate material and a buffer, wherein the whole cell particulate material comprises a phosphoric triester
35 hydrolase.

301. An oil-based paint comprising a whole cell particulate material and a buffer, wherein the whole cell particulate material comprises a phosphoric triester
hydrolase.

40 302. An latex paint comprising 0.001% to 40% by weight or volume of a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase.

45 303. An oil-based paint comprising 0.001% to 40% by weight or volume of a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase.

304. A multi-pack latex paint, wherein one container comprises 0.001% to 40%, by weight or volume of the paint, a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase.

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305. A multi-pack oil-based paint, wherein one container comprises 0.001% to 40%, by weight or volume of the paint, a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase.

10 306. A multi-pack latex paint, wherein one container comprises 0.001% to 40%, by weight or volume of the paint, a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase, and wherein the container comprising the whole cell particulate material further comprises a preservative, a wetting agent, a dispersing agent, a buffer, a liquid
15 component, a rheological modifier, or a combination thereof.

307. A multi-pack oil-based paint, wherein one container comprises 0.001% to 40%, by weight or volume of the paint, a whole cell particulate material, wherein the whole cell particulate material comprises a phosphoric triester hydrolase, and
20 wherein the container comprising the whole cell particulate material further comprises a preservative, a wetting agent, a dispersing agent, a buffer, a liquid component, a rheological modifier, or a combination thereof.

308. A two-pack latex paint, wherein one container comprises 100 parts by
25 volume paint, wherein a second container comprises three parts by volume of a biomolecular composition comprising a whole cell particulate material, wherein the whole cell particulate material comprises an organophosphorus hydrolase, and wherein each part of the biomolecular composition comprises 1 mg of whole cell particulate material and 50% glycerol.

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309. An two-pack oil-based paint, wherein one container comprises 100 parts by volume paint, wherein a second container comprises three parts by volume of a biomolecular composition comprising a whole cell particulate material, wherein the whole cell particulate material comprises an organophosphorus hydrolase,
35 and wherein each part of the biomolecular composition comprises 1 mg of whole cell particulate material and 50% glycerol.

310. A two-pack latex paint, wherein one container comprises 100 parts by volume paint, wherein a second container comprises three parts by volume of a biomolecular composition comprising a whole cell particulate material, wherein the whole cell particulate material comprises an organophosphorus hydrolase, wherein each part of the biomolecular composition comprises 1 mg of whole cell particulate material, wherein the paint comprises a buffer, and wherein the buffer comprises ammonium bicarbonate, a monobasic buffer, a dibasic phosphate
40 buffer, Trizma base, a five zwitterionic buffer, or a combination thereof.

45

311. An two-pack oil-based paint, wherein one container comprises 100 parts by volume paint, wherein a second container comprises three parts by volume of a biomolecular composition comprising a whole cell particulate material, wherein the whole cell particulate material comprises an organophosphorus hydrolase,
5 wherein each part of the biomolecular composition comprises 1 mg per milliliter of whole cell particulate material, wherein the paint comprises a buffer, and wherein the buffer comprises ammonium bicarbonate, a monobasic buffer, a dibasic phosphate buffer, Trizma base, a five zwitterionic buffer, or a combination thereof.
- 10 312. A non-film forming coating comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
- 15 313. An elastomer comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
314. A filler comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
- 20 315. An adhesive comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
316. A sealant comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
- 25 317. A material applied to a textile, comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
318. A wax comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
- 30 319. A surface treatment comprising a biomolecule composition, wherein the biomolecule composition comprises an active biomolecule.
- 35 320. A surface treatment of Claim 319, wherein the surface treatment is a coating, a paint, a non-film forming coating, an elastomer, an adhesive, an sealant, a material applied to a textile, or a wax.
- 40 321. The surface treatment of Claim 320, wherein the surface treatment comprises a pH indicator.